Integrating Basic Sciences and Clinical Practice: A Cross-Sectional Study of UQUMED’s Medical Education Approach

Saleh A.K. Saleh1,2*, Heba M. Adly3

Abstract

Introduction. Since the early 20th century, medical education has evolved, notably with the Flexner report emphasizing the fusion of foundational sciences and clinical reasoning. As the field grew, educators adeptly incorporated new sciences and technologies, ensuring curriculum balance and depth.

Aim. This research aimed to explore the role of basic sciences in contemporary medical education, focusing on their integration with clinical practice.

Methods. An institutional-based cross-sectional study design was implemented at Umm Al Qura University, College of Medicine, Makkah, Saudi Arabia, from March to June 2023. This study involved surveying 470 medical students, from a total campus population of 1,360 students (excluding preparatory year), using a pre-tested and structured self-administered questionnaire. All questions in the survey were formatted to elicit dichotomous responses, namely “yes” or “no”, and the collected data were analyzed using SPSS version 20.

Results. The study discovered that while a high percentage of medical students (96.6% in earlier years to 94% in senior years) recognized the importance of basic sciences in the MBBS curriculum, there was a noticeable decline in this belief as students advanced through their clinical years. Similarly, the perception of the utility of foundational knowledge of basic sciences for understanding clinical subjects decreased slightly from 93% in earlier years to 85% in senior years. About 92.7% of students across all years believed a strong understanding of basic sciences was crucial for clinical proficiency. However, the perceived benefit of suggested readings/textbooks declined from 82% in earlier years to 77% in senior years. Feedback on curriculum enhancements showed robust support for more engaging teaching methods, with over 90% favoring the incorporation of multimedia tools and group-based sessions.

Conclusions. Our findings underscore the foundational role of basic sciences in medical education for clinical competency, highlighting a gradual shift in student perceptions as they progress through their training. This shift signals the necessity for adaptive teaching strategies that effectively integrate basic sciences with clinical practice to maintain relevance and efficacy in medical curricula.

Keywords
Medical Pedagogy; Clinical Decision-Making; Basic Sciences; Educational Transformation; Syllabus Enhancement; Integrated Educational Approach

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Introduction

Medical education, a dynamic field crucial for shaping healthcare professionals, has evolved significantly. Globally, medical students typically spend the first 2-3 years of undergraduate study focusing on basic sciences [1], a practice greatly influenced by the 1910 Flexner report. This report, a cornerstone in medical education, underscored the importance of integrating foundational medical science
knowledge with clinical application, thereby improving patient care outcomes [2].

In the pre-Flexner era, medical education, especially in basic sciences, was fragmented, and American students often pursued foundational studies abroad [3, 4]. However, following the Flexner report, there was a pivotal shift towards a more structured and integrated curriculum [5]. This led to the emergence of the ‘academic clinician’, a model that gained international recognition and acceptance [6], highlighting the evolving and global nature of medical education.

**Evolving Paradigms in Medical Education: Balancing Depth, Breadth, and Technology**

Adapting to modern challenges, medical education faces the task of blending basic sciences with clinical practice amidst rapid technological and research advances [7]. The complexity of this integration has grown with the evolution of medical research and technology [8]. The Flexner 2 report advocates a holistic fusion of basic sciences and clinical scenarios, emphasizing the need for both medical knowledge and soft skills like communication and ethical reasoning [9–11]. This approach aims to prepare clinicians for the multifaceted global healthcare environment [12].

The scope of “basic sciences” in medical education now extends beyond traditional subjects like anatomy and physiology to include genetics, molecular medicine, and bioinformatics. This expansion reflects the importance of fields like virology and public health, particularly in light of recent pandemics [13, 14]. Modern curricula increasingly incorporate subjects like ethics and patient-doctor communication, indicating a broader view of medical education [15, 16].

Balancing depth and breadth of medical knowledge remains a challenge. Historical trends in medical education led to extensive syllabi, but recent shifts question the efficacy of this approach [17–19]. The focus of the United States Medical Licensing Examination (USMLE) Step 1 on practical application of basic sciences exemplifies this change, moving away from rote memorization towards understanding foundational concepts [23–26]. Additionally, incorporating technology in education drives a shift towards teaching critical thinking and adaptability over mere information accumulation [27, 28].

This balance between quality and quantity is crucial for designing curricula that promote in-depth understanding and prepare students for continuous learning in a rapidly changing medical field [29].

**Preserving the Vital Link: Clinical Reasoning and Basic Sciences**

The intricate relationship between clinical reasoning and basic sciences, though complex, is fundamentally symbiotic. Throughout the history of medical education, the significance of weaving these two threads into a cohesive tapestry has been widely recognized [30]. The journey from understanding ‘normal’ physiology to discerning ‘abnormal’ anomalies serves as the bedrock of logical reasoning in medicine [31].

Foundational basic sciences, including anatomy, physiology, and biochemistry, form the cornerstone for comprehending disease mechanisms and pathophysiology [32]. Without this foundational knowledge, clinical reasoning can drift into empiricism, potentially compromising the quality of patient care [33]. However, when firmly rooted in basic sciences, clinical decisions become evidence-based, resulting in improved diagnostic accuracy and therapeutic outcomes [34].

Modern medical curricula, informed by contemporary pedagogical theories like the “encapsulation theory”, strive for the seamless integration of clinical scenarios with foundational basic science concepts [35]. This approach not only reinforces the unbreakable bond between clinical reasoning and basic sciences but also enhances the learning experience for students. Research studies support the notion that students exposed to these integrated methodologies gain deeper insights into disease mechanisms, leading to more effective clinical decision-making [36].

**A Comprehensive Overview of the Umm Al Qura University, College of Medicine (UQUMED) MBBS Curriculum: Integrating Foundational Principles, Clinical Applications, and Saudi MED Proficiency Standards**

The Umm Al Qura University, College of Medicine (UQUMED) MBBS curriculum is designed with a student-centric approach, blending theoretical content with experiential learning, and a continuous emphasis on clinical application. It unfolds over six academic years and three stages: an introductory foundation year, five years of integrated clinical sciences and practice, and an internship. The curriculum seamlessly integrates multidisciplinary modules, emphasizing both horizontal and “vertical” learning, covering topics like Hajj and Umrah, Anatomy and Imaging, Clinical Skills, Professional Development, and Research and Evidence. This study delves into our institution’s distinctive medical education approach, particularly the synergy of basic sciences and clinical reasoning in the modern pedagogical landscape.

**Study Objective**

The objective of this study was to explore the importance of basic sciences in modern medical education and to evaluate their influence on the effective integration of clinical practice. By conducting a cross-sectional analysis, this research intended to analyze different approaches to medical education, focusing on how these approaches emphasize and incorporate basic sciences to develop and improve clinical competencies in medical students.

**Materials and Methods**

**Study Design and Participants**

This cross-sectional study was conducted at Umm Al Qura University, College of Medicine, Makkah, Saudi Arabia (UQUMED), from March to June 2023. The study sought to describe the undergraduate medical student cohort at the Makkah campus, specifically encompassing students from their second year through to their internship year.
The College of Medicine campus comprised 1,360 students, including 700 (51.5%) females and 660 (48.5%) males. A total of 450 students in the preparatory year were excluded from this investigation, as they had not yet begun their clinical studies, spanning both medicine and dentistry programs.

The minimal sample size was determined at level 271 (Confidence Level - 95%, margin of error - 5%). In the end, 470 students voluntarily participated in the survey.

Data Collection Tool
The survey used in this study was adapted from Yograj *et al.* [37], enhancing clarity and readability. To validate the survey effectiveness, a pilot testing phase was conducted with a select group of students. Their feedback was instrumental in refining the questions, ensuring clarity and comprehension.

Survey Structure:
Our finalized survey was structured into two distinct parts. Part 1 - Integration of Basic Sciences and Clinical Teaching, comprised 15 primary research questions. These questions were designed to assess students’ perspectives on the integration and importance of basic sciences in their medical education. Questions in this part probed various aspects such as the value of basic sciences in the curriculum, its relevance in understanding clinical subjects, and its significance in providing clarity regarding disease manifestations, among others. Part 2 - Academic Ranking and Retention, contained 5 specific questions. These questions aimed to gather data on students’ academic rankings and their retention rates. It is important to note that these questions were applicable only to a specific subset of students to whom these parameters pertained.

Question Format:
Irrespective of the parts, all 20 questions in the survey were formatted to elicit dichotomous responses, i.e., “yes” or “no”. This binary response format was chosen to facilitate quick and efficient completion by the participants.

Data Collection
The survey was distributed via WhatsApp, ensuring efficient access for all students. Participants provided informed consent prior to participation, and data privacy was maintained through pseudonymization of responses. The study received ethical approval from the Ethical Committee of the Faculty of Medicine at Umm al Qura University, further ensuring the ethical integrity of the research process.

Statistical Analysis
The data analysis was conducted using IBM SPSS Statistics for Windows, version 25. The analysis primarily focused on inferential statistics, employing the Chi-square test to compare observed frequencies. The threshold for statistical significance was established at a p-value of less than 0.01.

Results
Table 1 provides a clear insight into the perceptions of medical students from various academic years at UQUMED about the significance of basic sciences in the MBBS curriculum. Across all years, most of the students (> 90%) believed that the basic sciences taught during the first year were crucial for the MBBS curriculum. A particularly high agreement was seen among the students of the first two years, with 99% of both Year 2 and Year 3 endorsing this perspective. As students progressed in their academic journey, a slight decline was observed in this belief, although the agreement remained significantly high even in the senior years. Most students, about 90%, felt that foundational knowledge of basic sciences aided in understanding clinical subjects. This perception slightly diminished as students progressed through the clinical years, possibly suggesting that as they encountered more complex clinical scenarios, they found other factors, in addition to basic sciences, contributing to their understanding. A vast majority of students believed that a foundation in basic sciences enhanced clarity about disease signs and symptoms. This sentiment was especially high among the younger batches, with 99% of second-year students and 98% of third-year students agreeing. The declining trend is more subtle here, suggesting that understanding the basis of disease manifestations using basic science knowledge remains pivotal throughout.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Year 2 (n=105)</th>
<th>Year 3 (n=105)</th>
<th>Year 4 (n=90)</th>
<th>Year 5 (n=85)</th>
<th>Year 6 (n=85)</th>
<th>Total (n=470)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you believe the basic sciences taught are vital for the MBBS curriculum?</td>
<td>104 (99%)</td>
<td>104 (99%)</td>
<td>86 (96%)</td>
<td>81 (95%)</td>
<td>80 (94%)</td>
<td>455 (96.6%)</td>
</tr>
<tr>
<td>Does foundational knowledge of these basic sciences aid in grasping clinical subjects?</td>
<td>98 (93%)</td>
<td>97 (92%)</td>
<td>80 (89%)</td>
<td>74 (87%)</td>
<td>72 (85%)</td>
<td>421 (89.3%)</td>
</tr>
<tr>
<td>Does the grounding in the basic sciences enhance clarity regarding disease manifestations?</td>
<td>104 (99%)</td>
<td>103 (98%)</td>
<td>86 (95%)</td>
<td>79 (93%)</td>
<td>77 (91%)</td>
<td>449 (95.2%)</td>
</tr>
<tr>
<td>Is a robust understanding of the basic sciences essential for a proficient clinician?</td>
<td>99 (94%)</td>
<td>100 (95%)</td>
<td>84 (93%)</td>
<td>77 (91%)</td>
<td>77 (90%)</td>
<td>437 (92.7%)</td>
</tr>
<tr>
<td>Are the suggested readings/textbooks beneficial?</td>
<td>86 (82%)</td>
<td>99 (84%)</td>
<td>73 (81%)</td>
<td>67 (79%)</td>
<td>66 (77%)</td>
<td>380 (80.6%)</td>
</tr>
</tbody>
</table>

Note: The Chi-square test was applied to response rates of each question, with a significance threshold of p<0.01. The results confirmed statistical significance across all items in the survey.
the medical journey. Across all academic years, students overwhelmingly believed that a strong understanding of basic sciences was essential to become a proficient clinician. The belief remained consistently high throughout the years, emphasizing the undying importance of foundational knowledge for clinical expertise. While still a majority, a lower percentage of students, especially from senior years, believed that the recommended readings and textbooks were beneficial.

Table 2 presents responses from 470 students across five academic years. The data indicated a strong consensus on various aspects of basic science education: 93.6% agreed that lectures and sessions enhanced understanding, 91.3% found understanding challenging without instructor input, 89.8% affirmed faculty members’ accessibility for clarifying doubts, and 89.4% agreed that grasping and recalling subjects were demanding. Each of these questions showed statistically significant agreement among students (p < 0.01). Contrary to the initial interpretation, the consideration of postgraduation in basic sciences also exhibited statistical significance, with a consistent 26% across all years indicating this preference (p < 0.01), reflecting a significant, yet moderate interest in pursuing further studies in these fields.

Table 3 analyzes responses from 470 students across five academic years presenting their opinions on five educational enhancements. A total of 45.1% of students favored a shift towards clinical topics over foundational sciences, with a significant decrease in positive answers among sixth-year students. In contrast, significant support (p < 0.01) was observed for the inclusion of multimedia tools (92.1%), increased group-based sessions (94.3%), closer integration with clinical topics (88.7%), and an increased student-teacher ratio (80.2%). The high percentages and low p-values for these latter four questions indicated a statistically significant preference among the student population for these specific enhancements in basic sciences teaching.

Table 4 presents a comprehensive overview of 470 UQUMED MBBS students’ perspectives across five academic years, highlighting their academic experiences and perceptions. A substantial proportion of students rated their overall academic performance as ‘Excellent’ or ‘Good’, with a notable consistency across years (ranging from 28% to 35% for ‘Excellent’ and 65% to 72% for ‘Good’). The majority of students across all years observed significant advantages in their academic journey.

### Table 2. Attitudes of UQUMED Students Regarding Basic Sciences through the MBBS Program (n=470).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Year 2 (n=105)</th>
<th>Year 3 (n=105)</th>
<th>Year 4 (n=90)</th>
<th>Year 5 (n=85)</th>
<th>Year 6 (n=85)</th>
<th>Total (n=470)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do lectures and sessions enhance your understanding?</td>
<td>102 (97%)</td>
<td>100 (95%)</td>
<td>85 (94%)</td>
<td>78 (92%)</td>
<td>75 (88%)</td>
<td>440 (93.6%)</td>
</tr>
<tr>
<td>Is understanding these sciences challenging without instructor input?</td>
<td>100 (95%)</td>
<td>98 (93%)</td>
<td>82 (91%)</td>
<td>75 (88%)</td>
<td>74 (87%)</td>
<td>429 (91.3%)</td>
</tr>
<tr>
<td>Are faculty members accessible for clarifying doubts?</td>
<td>101 (96%)</td>
<td>99 (94%)</td>
<td>81 (90%)</td>
<td>72 (85%)</td>
<td>69 (81%)</td>
<td>422 (89.8%)</td>
</tr>
<tr>
<td>Are grasping and recalling these subjects demanding?</td>
<td>95 (90%)</td>
<td>93 (89%)</td>
<td>81 (90%)</td>
<td>77 (91%)</td>
<td>74 (87%)</td>
<td>420 (89.4%)</td>
</tr>
<tr>
<td>Do you consider postgraduation in one of these basic sciences?</td>
<td>27 (26%)</td>
<td>29 (28%)</td>
<td>23 (26%)</td>
<td>22 (26%)</td>
<td>21 (25%)</td>
<td>122 (26%)</td>
</tr>
</tbody>
</table>

**Note:** the Chi-square test was applied to response rates of each question, with a significance threshold of p<0.01. The results confirmed statistical significance across all items in the survey.

### Table 3. Feedback of UQUMED MBBS Students on Enhancements for Basic Science Teaching (n=470).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Year 2 (n=105)</th>
<th>Year 3 (n=105)</th>
<th>Year 4 (n=90)</th>
<th>Year 5 (n=85)</th>
<th>Year 6 (n=85)</th>
<th>Total (n=470)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should teaching emphasis shift more towards clinical topics than foundational sciences?</td>
<td>50 (48%)*</td>
<td>49 (47%)*</td>
<td>46 (51%)*</td>
<td>35 (41%)*</td>
<td>32 (38%)*</td>
<td>212 (45.1%)*</td>
</tr>
<tr>
<td>Would greater inclusion of multimedia tools enhance understanding?</td>
<td>98 (93%)*</td>
<td>96 (91%)*</td>
<td>86 (95%)*</td>
<td>78 (92%)*</td>
<td>75 (88%)*</td>
<td>433 (92.1%)*</td>
</tr>
<tr>
<td>Should there be an increase in group-based sessions and tutorials in tandem with lectures?</td>
<td>100 (95%)*</td>
<td>99 (94%)*</td>
<td>87 (97%)*</td>
<td>80 (94%)*</td>
<td>77 (91%)*</td>
<td>443 (94.3%)*</td>
</tr>
<tr>
<td>Would connecting these subjects more closely with clinical topics in an integrated curriculum be helpful?</td>
<td>93 (88%)*</td>
<td>91 (87%)*</td>
<td>85 (94%)*</td>
<td>76 (89%)*</td>
<td>72 (85%)*</td>
<td>417 (88.7%)*</td>
</tr>
<tr>
<td>Is there a need to increase the present student-teacher ratio?</td>
<td>84 (80%)*</td>
<td>83 (79%)*</td>
<td>78 (87%)*</td>
<td>69 (81%)*</td>
<td>63 (74%)*</td>
<td>377 (80.2%)*</td>
</tr>
</tbody>
</table>

**Note:** *p<0.01
Table 4. Student Perceptions of Academic Performance and Support in the UQUMED MBBS Program Across Five Academic Years (n=470).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Year 2 (n=105)</th>
<th>Year 3 (n=105)</th>
<th>Year 4 (n=90)</th>
<th>Year 5 (n=85)</th>
<th>Year 6 (n=85)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Year Title</td>
<td>Basic Clinical Science-1</td>
<td>Basic Clinical Science-2</td>
<td>Clinical Practice-1</td>
<td>Clinical Practice-2</td>
<td>Pre-internship</td>
</tr>
<tr>
<td>How would you rate your overall academic performance in the MBBS program?</td>
<td>Excellent (30%, 32) Good (70%, 74)</td>
<td>Excellent (28%, 29) Good (72%, 76)</td>
<td>Excellent (35%, 32) Good (65%, 59)</td>
<td>Excellent (32%, 27) Good (68%, 58)</td>
<td>Excellent (33%, 28) Good (67%, 57)</td>
</tr>
<tr>
<td>Have you observed any significant changes in your academic ranking throughout your MBBS program?</td>
<td>Yes (80%, 84) No (20%, 21)</td>
<td>Yes (82%, 86) No (18%, 19)</td>
<td>Yes (85%, 77) No (15%, 14)</td>
<td>Yes (80%, 68) No (20%, 17)</td>
<td>Yes (78%, 67) No (22%, 19)</td>
</tr>
<tr>
<td>Are you aware of the retention rates of students within your academic year in the MBBS program?</td>
<td>Yes (90%, 95) No (10%, 11)</td>
<td>Yes (92%, 97) No (8%, 9)</td>
<td>Yes (91%, 82) No (9%, 9)</td>
<td>Yes (89%, 76) No (11%, 10)</td>
<td>Yes (88%, 75) No (12%, 11)</td>
</tr>
<tr>
<td>Do you believe there is a correlation between your academic ranking and your clinical performance?</td>
<td>Yes (75%, 79) No (25%, 27)</td>
<td>Yes (77%, 81) No (23%, 25)</td>
<td>Yes (80%, 72) No (20%, 18)</td>
<td>Yes (78%, 67) No (22%, 19)</td>
<td>Yes (76%, 65) No (24%, 21)</td>
</tr>
<tr>
<td>How has the academic support provided by UQUMED influenced your academic ranking?</td>
<td>Significantly (60%, 63) Moderately (40%, 42)</td>
<td>Significantly (62%, 65) Moderately (38%, 40)</td>
<td>Significantly (65%, 59) Moderately (35%, 32)</td>
<td>Significantly (63%, 54) Moderately (37%, 32)</td>
<td>Significantly (61%, 52) Moderately (39%, 34)</td>
</tr>
</tbody>
</table>

Discussion

In this study, the participation of medical students across various academic years was evenly distributed: Year 2 and Year 3 each had 105 (22.34%) students. Year 4 saw the participation of 90 (19.15%) students. Similarly, Year 5 and Year 6 each contributed 85 students, each constituting 18.09% of the study population. The overall retention rate within this cohort was standing at 97.8%, indicating a high level of student engagement and continuity across the different academic years. The total number of participants in the study was 470 students.

The core subjects such as anatomy, physiology, and biochemistry often fall under the umbrella of basic sciences. This is mainly because, during their study, students are not mandated to attend clinical rotations. On the other hand, pharmacology, pathology, and microbiology might occasionally be classified as basic sciences, they do possess clinical segments, and thus, are not strictly included in the basic sciences category [38]. The Board of Governance (BoG) has rolled out a revamped undergraduate syllabus for MBBS students, now referred to as IMG. According to the BoG’s directive, the curriculum should be framed with several pivotal elements in mind. These include achieving wide-ranging competencies, retention of knowledge by subject, curbing information saturation through integrated teaching, and aligning the teaching and assessment processes with predefined outcomes and competency benchmarks [39].

This study research explored the role of basic sciences in the MBBS curriculum, with a substantial 96.6% of participants from UQUMED Makkah campus affirming its significance. The majority felt that understanding these subjects laid the groundwork for comprehending clinical topics. An overwhelming 89.3% believed that mastering these foundational subjects was vital for becoming proficient clinicians. These sentiments align with findings from Sentí et al., Shah et al. and Shanker et al.[40–42].

A solid grasp of normal anatomy, functions, and biochemical reactions imparted by these basic subjects is essential for becoming proficient clinicians. These sentiments align with findings from Sentí et al., Shah et al. and Shanker et al.[40–42]. A solid grasp of normal anatomy, functions, and biochemical reactions imparted by these basic subjects is essential for becoming proficient clinicians. These sentiments align with findings from Sentí et al., Shah et al. and Shanker et al.[40–42].

Lectures offer systematic, concise information, while tutorials, addressing smaller groups, are interactive, allowing students to share thoughts and questions [46]. Most study respondents highlighted the invaluable guidance of teachers throughout their studies. In their initial medical school years, students possess untapped potential that needs direction, and experienced teachers help guide their learning. Yet, only 26.2% considered pursuing one of these basic subjects for postgraduate studies, similar to findings from Kumar Jha et al., Oyebola and Adewoye, and Zia et al. [47–49]. This preference leans towards clinical specializations, which are perceived as more rewarding both financially and socially.

Integrated teaching fosters holistic understanding, engages students, and lessens academic strain. Many partici-
pants expressed a desire for increased use of multimedia tools and more group discussions. A multifaceted learning approach, combining lectures with visual aids, enhances comprehension and retention. Discussions stimulate active participation, fostering idea generation and doubt clarification [50].

The majority felt that one year was insufficient to grasp basic sciences and advocated for a higher student-teacher ratio. Historical consensus, since Flexner’s time, suggests at least a two-year foundational period in basic sciences for competent clinical practice [51, 52]. Students often overlook the significance of basic sciences during their early medical years, only to realize their importance later. Gupta et al. found similar inclinations, with students gravitating towards subjects that teachers made appealing and clinically relevant Students’ interest in subjects varied: physiology (84.2%), anatomy (50.2%), and biochemistry (41.4%) [53, 54].

Medical professionals require a robust understanding of basic sciences for complex clinical cases, though its significance for diagnostic reasoning is often undervalued [55]. Incorporating applied and clinical aspects side by side in the basic sciences curriculum, as achieved by vertical integration, is essential. Our findings support the newly proposed competency-based undergraduate curriculum, emphasizing learner-centered, patient-centric, gender-sensitive, outcome-oriented, environmentally fitting approaches with an emphasis on interdisciplinary collaboration [56].

Our findings resonate with the broader academic discourse, suggesting a growing appreciation for the role of basic sciences in shaping competent medical professionals. They support the notion that an effective medical curriculum should not only impart knowledge but also foster the ability to apply this knowledge in real-world clinical settings, thus bridging the gap between theoretical learning and practical application [57, 58].

### Limitations

This comprehensive study has illustrated the development, significance, and current state of the UQUMED curriculum as a model of medical education, as well as insights into the students’ perceptions of basic sciences. However, several limitations can be noted: **Single Institution Bias**: the study primarily focuses on the UQUMED curriculum and its students. While valuable for localized insights, the results may not be generalizable to other institutions with different cultures, values, or resources. **Subjective Student Feedback**: while student feedback provides a rich source of insights, it is inherently subjective. The reported perceptions about the significance of basic sciences might be influenced by personal experiences, individual teachers, or transient trends in education. **Lack of Longitudinal Data**: insights into how the UQUMED curriculum impacts long-term outcomes, such as post-graduation clinical competency, career trajectories, or specialization choices, are not provided.

### Conclusions

This study highlights the crucial role of basic sciences in modern medical education, emphasizing their importance in the effective integration of clinical practice. The findings from UQUMED Makkah campus demonstrate how an integrated curriculum that prioritizes and effectively implements basic sciences can significantly enhance clinical competencies in medical students. This approach not only strengthens students’ foundational knowledge but also bridges the gap between theoretical understanding and practical application. The study underscores the necessity for medical education systems worldwide to focus on robustly integrating basic sciences to prepare competent and skilled healthcare professionals for the challenges of contemporary medical practice.

### Ethical Statement

No human or animals’ data or samples were collected.

### Informed Consent

The authors asked all participants to sign a consent form for confidentiality of their data, and the questionnaire was anonymous, and no personal data were collected.

### Data Availability

Data are available upon request from the authors.

### Conflict of Interest

The authors declare that they have no conflicts of interest.

### Financial Disclosure

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### References


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